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Rate of Urbanization and its Relationship with Fertility Decline in Latin America

by

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Abstract

Latin America has experienced significant increases in urbanization since World War II and dramatic declines in crude birth rate since the late 1960's. Planners may try to link these two phenomena and claim that an increasing rate of urbanization will precipitate a similar increase in rate of fertility decline. But rapid urbanization is associated with severe problems in overcrowded big cities. This study has found that, in fact, the rate of urbanization has no causal link to changes in the fertility rate. Furthermore, although studies of Third World fertility have found that family planning programs make significant contributions to fertility decline, in the Latin American context, education is more important.

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Rate of Urbanization and its Relationship with Fertility Decline in Latin America

M. Lisa Nichol

I. INTRODUCTION

In many Latin American countries, mortality rates began falling just after the turn of the century while birth rates remained high, and a rapid net growth resulted. Fertility levels have been falling since the late 1960's, and growth is slowing considerably on a percentage-per-year basis, although the raw number added to the population each year is still increasing. Furthermore, urbanization levels have been steadily climbing for some time and increasing very rapidly in the more recent past. In some areas, the absolute levels are approaching urbanization levels of the developed world, although birth rates are not comparable in the two regions. It is tempting to try to attribute part of the fertility decline to increases in urbanization, as is done when the Demographic Transition model is used to explain the European experience of the 19th century. However, there is reason to believe that when one controls for variables that have a direct bearing on the fertility process such as education and family planning, the urbanization element does not contribute to fertility decline; although urbanization and fertility decline may be present together, they are coincident and may be correlated but not causally linked.

Earlier studies, such as that by Tolnay and Christenson (1984), found no significant relationship between the *level* of urbanization and the change in fertility, but they were looking at the entire Third World. Urbanization has occurred so rapidly in Latin America that it deserves to be considered separately in a more specific analysis that takes into account the rate and

the level of urbanization.

The focus here is to evaluate the nature and strength of the relationship between the rate of urbanization and the decline of the crude birth rate in Latin America. The goal of this study is to analyze the proportionate rate of change in percent urban and its effect on the proportionate rate of change in the crude birth rate, while controlling for education, infant mortality, family planning effort, level of urbanization, and income per capita. This means that instead of considering the first-degree relationship between the absolute amount of decline in fertility and the absolute increase in urbanization, the analysis will consider the link between rate of urbanization and rate of decline in fertility rate; this relationship will be evaluated using regression analysis. This may be likened to examining the second derivative of the equation rather than the first derivative, its acceleration rather than just its velocity.

The point is that the *rate* of urbanization might be seen as something different than the level of urbanization. Even if the level of urbanization is comparable to urbanization levels of developed countries, if this level has been reached "overnight, the benefits of urbanization may be outweighed by disadvantages. The hypothesis is that urbanization that happens too quickly does not contribute to the social development of a country and may in fact be detrimental.

If our hypothesis is correct; urbanization rate should have no significant effect on Latin American fertility decline. The test of this hypothesis and the interpretation of results will be compared to a similar study of the Third World by Tolany and Christenson (1984).

II. Background and Literature Review

A. Trends Since 1950 in Latin American Fertility

After a long history of relatively moderate growth, the Latin American population growth rate began to skyrocket between 1950 and 1965, growing at 2.75 percent annually. Then, between 1965 and 1985, it began to slow down, increasing at an average of 2.43 percent annually. (Merrick 1986, 7) Birth rate declines of over 25 percent occurred in a majority of countries between 1960-65 and 1980-85. (cited in Merrick 1986, 15; Tsui and Bogue: 11) But Merrick points out that even in countries where growth rates declined, their actual *level* remained high-- three percent or more a year in Venezuela, Honduras, and Mexico, but below the 2.43 percent regional average in Cuba, Argentina, Uruguay, and Jamaica after 1965. (Merrick 1986: 8) This decline has been examined by many other researchers, including Steven Beaver (1975), who found ties between fertility declines and a variety of socioeconomic indicators. These factors will be examined in more detail in section II C, while the biological determinants of fertility are discussed in II B.

Until the 1950's, the population of Latin America was very similar to that of the United States and was growing at a comparable rate. (Merrick 1986: 3) In the Third World as a whole, the urban population went from 275 million to 800 million people between 1950 and 1975. (During this time, Latin America participated fully in this population boom.) During the same time in the developed world, the population went from 500 million to 750 million, an increase of two-and-a-half times as compared to an eightfold

increase in the Third World urban population. (Goldstein1983, 5)

There are some researchers who are trying to discover the underlying causes behind population trends in Latin America because they believe that the developing countries that make up Central and South America, truly a heterogenous group, could benefit from further reduction in their fertility rates. Already, declines have occurred in most of these countries, but in many the actual levels of fertility are still relatively high.

Rafael Salas is one who is finding numerous examples of Third World and Latin American urbanization without the expected accompanying development. (Salas1984, 45) Contrary to the idea that increasing proportions of people living in cities will automatically bring along economic growth, it has been found that in many Latin American countries, the experience has been one of urbanization without industrialization, and the expected economies of scale are not developing. Instead, slums, shantytowns, and diseconomies have developed. (Salas1984, 45; Merrick 1985) Large numbers of rural to urban migrants in the recent past are straining the urban service systems planned years ago. (Merrick 1986) Urbanization is intrinsically linked to many of the other determinants of fertility that will be discussed, such as education of women and influence of family planning programs.

There are many problems attributed to rapid growth and internal redistribution of population of the kind seen in Latin America after World War II, but the causes of these problems are not completely agreed upon. The contribution of migrants to such problem areas as urban natural increase, unemployment, crime, health problems, political instability and environmental deterioration is still in question, according to Goldstein.

(1983, 14) Thomas Merrick cites deficits in education, housing, health services, urban transportation systems and other infrastructure, and especially in employment. The results of the ensuing industrializaton and rapid urbanization are slum housing, unemployment, urban poverty, strains on all urban services, and political unrest. (Merrick 1986, 6, 24)

Some researchers apply the Demographic Transition model, based on Britain's demographic experience of the late 19th century, to countries like those in Latin America experiencing fertility decline today. Beaver (1975) has reconsidered the whole issue and added some qualifications to the model so that it can be applied to the Latin American case. A large number of researchers don't agree with the extant criticisms of the theory and have no trouble applying the model to Latin America, while others find it difficult to justify.

It is important to remember that the 19th century fertility declines in Britain took place without the benefit of modern family planning programs that are in existence in many Third World countries today. So this group of researchers maintains that social and economic variables once thought to have had great effect on the European transition were not at comparable levels at the time of those declines in the 19th century, and so couldn't have had as much of an impact as was commonly attributed to them. (Tolnay and Christenson 1984, 75) Therefore, it is even more risky to expect these same variables to decline in the same way in Latin America, especially since it is culturally quite distinct from Europe. The truth is that it is difficult even to generalize for Latin America as a whole, and much harder or even impossible to create a model appropriate for the whole world. Part of the problem is due to the vague definition of the transition and the variables that are

considered to be part of it. So perhaps trying to apply the Demographic Transition model to Latin America is incorrect unless it is modified for the Latin American context like Beaver has attempted to do. The view taken in this paper is summarized by the Tolnay study:

> "Our reassessment of the impact of social setting variables on recent fertility declines, including their indirect effects via family planning programs, is consistent with Demographic Transition Theory which specifies a critical link between socio-economic development and fertility decline, largely through changing reproductive motivation." (1984, 86)

B. Biological or Proximate Determinants of Fertility

Social and economic factors influence fertility in a society in a secondary manner. Fertility rates are directly controlled by well-defined biological actions, while "values [the socio-economic variables we will refer to later], in order to affect natality, must be translated into control over a biological process such as conception, gestation, or age at entry into unions." (Beaver 1975, 44) This section will explore these primary factors accounting for the biological side of the fertility equation or the "supply" of children. (Bulatao and Lee 1983).

Marriage patterns which have important effects on fertility include average age at marriage and overall proportion of women ever-married. Tsui and Bogue explain that the age at marriage has been rising in many developing countries due to factors such as socioeconomic development, cultural variations, and family planning concerns. (Tsui and Bogue 1978, 17) This is only a part of the explanation for the falling birth rates evident in

some of these countries, and shows an example of the link between socioeconomic variables and biological ones. For example, age at marriage will also be influenced by the amount of education the woman has. (Merrick 1985, 15) But in the Population Bulletin Merrick urges caution in using marriage prevalence "as an indicator of exposure to the risk of conception" due to changes in the kinds of unions in operation. "Consensual" unions in lieu of marriage "are becoming more common. . . and pregnancy itself may be the reason for formalizing the union." (Merrick 1986: 20) Once a union of any kind exists, it is the practice of fertility control which affects the number of children born to a family.

The use of contraceptives is dependent, in turn, on the social and economic values of the population. "Contraceptive use has gone up significantly in most Latin American countries and this has been by far the most important of the proximate determinants in recent fertility declines." (Merrick 1986, 16) Tolnay and Christenson, whose study focused on the effects of family planning programs and social and economic conditions, "cannot necessarily endorse the belief that 'development is the best contraceptive' but could suggest that development *and* the best contraceptive is a powerful combination, indeed." (1984, 87) Another kind of contraception, although more indirect and perhaps less deliberate than the other methods, is the practice of breastfeeding. "Prolonged breastfeeding of 15 to 20 months, common in Africa and Asia, can lengthen the time between births and ultimately lower overall fertility by extending the period of women's natural infertility after childbirth," says Merrick. But 10 months or less is the average span for breastfeeding children in Latin America, which allows for little effect on birth rates. (1986, 16)

Abortion is also a possibility for fertility control. It is prevalent all over the continent, although it is illegal in all Latin American countries except Cuba. But due to the secretive nature of the operations, it is hard to keep accurate records of occurrences. (Merrick 1986, 18)

Among unmarried adults, abstinence is another method of preventing the conception of a child. However, the recent increased existence of consensual unions has reduced pre-marital abstinence somewhat. Older adults may also decide that this is the method they will use to keep from having more children.

Age structure is another important general component in overall growth rates. It is "one of the principal ties between demographic processes and socioeconomic changes." (Merrick 1986, 9) Women under 30 years old experienced the largest declines in age-specific fertility rates since 1965. "This suggests rising age at marriage has played an important role in fertility decline." (Tsui and Bogue 1978, 16) Age structure will, however, slow the current decline in birth rates due to the exaggerated number of women in the younger age ranges resulting from the rapid growth before the 1960's decline began. (Merrick 1986, 19) This is the concept of population momentum in action; although the birth rate has declined, the number of births continues to rise. In the Latin American case, as in the rest of the Third World, it is the youth component rather than the elderly component that is the critical issue in the very high dependency ratio. (Merrick 1986: 10, 46)

As already stressed, the social and economic factors yet to be discussed affect fertility by working through the biological factors. An example of these linkages is the amount of education a woman has; it affects

her age at marriage and the use of contraception, and these in turn affect how many children she has. (Merrick 1986, 16) We turn now to a discussion of these "secondary" but equally important factors.

C. Socioeconomic Determinants of Fertility

The secondary socioeconomic variables have both direct and indirect effects in the fertility equation. The system of family planning organizations can be considered as direct attempts to influence the actual fertility control practiced by couples, while indirect factors such as amount of schooling, female participation in work force, existing infant mortality rate, urbanization, and class status affect fertility by affecting the social situation in which a woman or a couple lives and works, and operates through such intermediary variables as the biological factors and family planning effort to affect the "demand" for children. (Bulatao and Lee 1983) Tolnay and Christenson's study separated family planning from social setting indicators to assess the different nature of these variables. Tsui and Bogue found that "the higher socioeconomic development level reached in 1975, the greater the average decline in total fertility rate (TFR) between 1968 and 1975." (1978, 22)

Family planning programs try to directly influence the fertility practices by trying to control supply (listed as biological determinants) and by helping couples to realize their own goals of reduced demand for children by supplying information and health assistance. (Beaver 1975) Family planning is listed as a factor on the socioeconomic side of the equation because a country's willingness to implement such a program is related to the unique social, cultural, and economic characteristics of each country.

Several studies have concluded that family planning programs do have significant effects on fertility rates in developing countries. (Tsui and Bogue 1978, 24; Tolnay and Christenson 1984, 86) In fact, Tolnay and Christenson cite two more studies: one by Freedman and Bereison (1976), and the other by Mauldin and Bereison (1978). Both studies found that family planning effort "explained more unique variation than social setting in fertility decline between 1965 and 1975," and that "the combined effects of indirect and direct effects approached the impact of family planning" in the sixty-five developing countries investigated. (Tolnay and Christenson1984, 73)

One criticism of these programs is that they only work in certain situations and that noticeable declines in fertility only occur when a certain level of "development" has been acheived. Davis (1967) concluded that "contraception itself is not a driving force bringing about reduced fertility; rather, it simply helps translate other social changes into sustained fertility declines." This echoes the sentiments of Demeny (1979) and van de Walle (1980), who are also skeptical about the success of family planning in countries where reduced fertility has not already begun. (cited in Tolnay and Christenson 1984, 73)

Fertility decline has already begun in Latin America, and as will be shown in the empirical section, has been affected somewhat by family planning, although education is the main factor in this case.

Tolnay and Christenson have found that "family planning program effort, itself, is to some extent a product of pre-existing social conditions faced by a nation" but that the programs were equally effective in situations both with and without previous fertility decline. (1984, 85) They found that

the most critical elements of "social conditions" were infant mortality levels and school enrollment, defined as percent of children age 15-19 in school. (1984, 86) This situation applies well to the Latin American case, as we will see in the methodology section of this study.

The socio-economic variables make up the other half of the secondary components in fertility decline. Heading the list of secondary determinants of fertility is the level of education. This can be measured in several different ways by including unique components of the population. School enrollment as a percent of all children of schoolable age, and the average years of schooling achieved by the population in general are common definitions of education. It has been found in several studies that the education of *women* is the most decisive factor relating to fertility. However, Rodriguez and Cleland caution that while it is true that the largest ranges in fertility in the world are found in Latin America, "where fertility declines steadily as wife's education increases," the results "often attributed to women's education reflect instead a more general effect of socioeconomic status." (Rodriguez and Cleland 1981, 97) This is an example of the difficulties in measuring secondary effects.

It is true that the education of women has increased "significantly" in Latin America in the last three decades. "These and other changes affected the social and economic groups whose fertility had been highest and without whose participation the rapid fertility decline would not have occurred." (Merrick 1986: 18; Tsui and Bogue 1978, 19)

The participation of women in the work force has been found to be

another important contributor to fertility decline, and it is linked to women's education as well. In Latin America, only 18 percent of the non-agricultural work force is comprised of women, compared to percents ranging up to 32 percent in other developing areas of the world. North Africa had the only lower score, with 8 percent of the women working. (Merrick 1986: 32) The combination of differences in education and employment opportunities for women has been found to "account for one-half of the differential between rural and urban fertility." (Rodriguez and Cleland 1981, 93)

Contrary to common belief, the work status of the husband had a minimal role in the socioeconomic equation of fertility. (Rodriguez and Cleland 1981, 93, 96)

Another commonly considered variable in literature on the Demographic Transition is income, usually measured as GNP per capita. Tsui and Bogue cite inconclusive results on the effect of this variable on fertility (1978, 19). Tolnay and Christenson found (to their surprise) that GNP per capita was virtually unimportant in the equation (1984,84). Many studies find the effects of this factor hard to characterize. (See Beaver 1975 for example) The present study found no relationship between GNP per capita and fertility decline. Perhaps when the actual distribution of income is uneven among the population, such as it is in Latin America, its impact on fertility is not captured by measures of average income across the population as a whole. Merrick hints at this double standard, saying that because the middle- and upper-income women can hire child-care, they can work *and* have children, while lower-income women have to make a choice between having a job and taking care of their children. (Merrick 1986, 17)

Infant mortality rate is a way to measure income and living conditions, and it is inherently tied to many of the other socioeconomic variables, especially education. Merrick describes the class differentials in rates of infant mortality, mentioning the "persistent gaps between rich and poor." (Merrick 1986,14) It has been found that declines in infant mortality rates tend to be related to declines in birth rates for the simple reason that "a better health environment reduces the need for excessive fertility to ensure survival to adulthood." (Tsui and Bogue 1978, 19) Tolnay and Christenson concur; they believe that both general and infant mortality are responsive to characteristics of the social setting. (1984, 79)

It is sometimes assumed that the Catholic church is to blame for high Latin American fertility rates. But the effects of the wide nominal participation in the Catholic church does not have the effect on fertility that is commonly perceived. This can be seen in the practice of abortion, although illegal, and birth control through contraception. At the popular level, "religious affiliation does not imply strict adherence to Church teachings" (including its conservative stance on family planning). (Merrick 1986, 41; Beaver 1975, 51). However, although the pro-natalist viewpoint of the Catholic church may not have much effect on individual behavior, "in the political arena the Church's influence on government decision-makers is often crucial." (Jones 1981, 190)

We come now to the discussion of urbanization, the variable under investigation in this study. It is seen as an important factor by some writers in discussions of the Demographic Transition. There are researchers who see the positive side of urbanization and its positive relationship with

Transition theory, such as Beaver (1975), Tolnay and Christenson (1984), and Banguero and Guerrero (1983). Transition theory suggests to them that the "economic burden of children is expected to be greater in cities than in the countryside," a disadvantage to higher fertility in cities. There are more non-agricultural employment opportunities for women in the city, delaying marriage and reducing fertility. Finally, more "efficient modes of communication in urban centers facilitate the spread of what Caldwell (1976) calls 'westernization'." (cited in Tolnay and Christenson 1984, 77) The implication is that higher levels of urbanization go hand in hand with reduced fertility. Beaver includes urbanization as one of the three key factors, the other two being education and "levels of living." (1975, 58)

A higher level of urbanization is usually expected to accommodate "westernization" and have a positive direct effect on fertility decline. Indirect effects are also expected, for example, if popular demand for better distribution of family planning resources is shown, the nation may decide to go ahead and spend more on these programs. It is also suggested that better health care facilities in cities will have a negative effect on infant mortality, leading to decreased fertility. (Tolnay and Christenson: 78) And the present study found that school enrollment had a significant effect on Latin American fertility decline. A question to be pursued in further research is whether or not these facilities are evenly distributed and accessible to people within each city.

In Latin America, where many countries have achieved urbanization levels similar to Western countries, "urbanism" or "westernization" may or may not be present. The existence of large urban centers may make it possible for more contact between couples and health, education, and family

planning facilities, but this does not occur simply by virtue of the city's existence. In the Western experience, cities have traditionally been unhealthy places to live in because of the character of the city-- industrial, crowded, poor in certain sections, and lacking sufficient sanitation. It may be that in the Latin American case, given the rapid rate of urbanization, a similar problem situation exists today due to the possibility of uneven development within cities leading to unequal access to health and education centers.

Goldstein (1983) expounds on the counter-side of urbanization and insists that it has a negative effect on development; concurring authors include Goldscheider (1983), Rondinelli (1983), who emphasize the development of secondary cities, Arriaga, who argues against any application of Transition Theory to Latin America (cited in Beaver 1975), and Ulack and Leinbach (1985), who say, "A large body of literature has developed from the premise that rapid urban growth in the Third World poses a major threat to the achievement of various social and economic goals." (1985, 310)

An important component in the population growth issue is the distribution of this growth. In Latin America, urban areas are growing faster than rural areas. This is due to the rapid migration of people from rural areas to the cities and larger towns and also due to natural increase within the city. Rural-urban migration is happening at a very rapid rate and, in many countries, is focused on only one or two primate cities. The existing urban infrastructure is incapable of handling the added strains of this unexpected massive population. One concern that arises is whether or not an increase in the level of urbanization is of the same "quality" as urbanization occurring at a more moderate pace.

Part of this concern stems from the idea that primate cities, the inordinately large urban centers evident in several Latin American countries, are the centers of a focused rural-urban migration stream and cannot seem to divert people to secondary cities; diversion to growth poles could make the final step-by-step migration to the biggest cities a smoother process, allowing migrants more chances to assimilate. As it is, major cities are staggering under the strain. Rondinelli explains:

> Using rough but conservative estimates, Unikel found in 1970 that if Mexico City reached a projected population of 21 million by 1990, the national government would have to spend the equivalent (in 1970 dollars) of about $3.2 billion a year over the next 20 years to settle new migrants within the city and to supply the existing population with minimal housing, water, electricity, transportation, and health and educational services. . . . It is equivalent to establishing a city comparable in size to Guadalajara, Mexico's second largest metropolis, every year. (1983, 32)

If urbanization is not causally linked to fertility, it is possible that it could be *made* to be helpful by improving the quality of the urbanization going on and allowing it to assist in the development process. "Secondary cities can and must contribute to development-- deconcentrating urbanization, reducing regional inequalities, increasing administrative capacity, reducing urban poverty, and stimulating rural economies." (Rondinelli 1983) Under this scenario, even if the same number of people decide to leave the rural areas for the cities, they will have more destinations to choose from, instead of inundating one major city. More slowly growing cities, in turn, may have more opportunity to improve social services at a rate comparable to the growth of their population.

The question is whether or not rural migrants have trouble assimilating urban fertility values. Of interest is the change in fertility rate once migrants arrive in the city. This variable is implicitly related to the assimilation of other elements of the urban value system. Does the number of children desired by a couple automatically drop when they move to the city? Or, does it take some time for the urban value system to sink in, thus showing a delayed drop in national fertility rates in relation to the rate of urbanization? Perhaps it is true that better availability of contraceptives in the city makes it possible for couples to actually control family size. (Beaver1975)

Some of the models assume that fertility decline is expected to mirror changes in urbanization, simply because rural- urban migrants change automatically to "urban" fertility patterns. Goldstein explains that "the literature on the dynamics of migrant adaptation to the urban environment and culture--...[including] whether they adopt the lower fertility levels that generally characterize the urban population, and a host of other questions--is by no means conclusive." (1983, 15) Goldstein himself expresses concern with the "increasing concentration of people in urban places, particularly in big cities. This latter process is often associated with a number of adverse situations, including... [migrants having a hard time finding work in the city, unbalanced development of different urban areas, inadequate housing and social services, environmental contamination, and] social-psychological stress among both natives and migrants as they compete for limited jobs and for access to health and educational facilities and living space." (1983, 3) The process of urban- ruralization evident in some cities suggests the rural migrants' need to form a cohesive society of their own within the unfamiliar

urban context.

Some of the problems associated with a rapid increase in urbanization level have been addressed by Merrick (1986), who discusses rapid urban growth and unemployment, rapid social and economic change, and the effects of rate of change in percent urban on the rate of change in fertility. He points out that in many cases shantytowns exist because they do provide inexpensive housing with little overhead costs to migrants. The residents of shantytowns tend not to be the newest migrants to the city, but rather earlier migrants who have found that other kinds of housing are not affordable. (Merrick 1986: 22) Another question that would be interesting to pursue concerns fertility differentials *within* cities: distribution and persistence of high birth rates correlated with the migrants' length of time in the city.

Rural-urban migration is not the only element of importance in the study of urbanization since the rate of growth of the city population from within is the major contributor to increases in city size and hence to increases in both level and rate of urbanization. "Rapid urban growth in less-developed nations is. . . inextricably interwoven with rapid natural increase" since, in the Third World as a whole, natural increase in urban areas accounts for 61% of growth, whereas migration contributes 39%. (Goldstein 1983, 9)

Two groups of opinions have developed in recent studies. As explained by Goldstein, the first group stresses the difficulties the migrant has to overcome in the city and the negative consequences of migration to receiving areas and to the quality of life of the individual migrant. The opposing view emphasizes continuity of life in rural and urban areas, the opportunities in urban places for migrants and positive gains resulting from migration.

(Goldstein 1983, 4)

The one point of agreement between the two schools is the concept of lag time. Tolnay and Christenson (1984) also built lag times into their model without really discussing the rationale behind doing so; they use data from different years for different variables. School enrollment was from 1960, family planning index was from 1972, and infant moratlity rate from 1968, while the dependent variable, percent decline in percent urban, was calculated for the 1965-1975 interval. Beaver incorporates ten and fifteen year lags in urbanization into his regression model testing Transition Theory variables and their relation to fertility. His results claim a zero-order correlation of -.720 between urbanization level and crude birth rate. (Beaver1975,125)

The need for a lag-time component indicates again that assimilation of rural migrants and migrants from small cities into a big urban area such as a primate city is an important factor when urbanization and urbanism are under investigation. "Transition theory suggests that the values and attitudes governing family size take some time to respond to a *changing social environment.*" (Jones 1981, 134. Italics mine.) Measuring changes in fertility is a way to approximate the changes in values associated with urbanism.

III. Research Design

The relationship tested in this paper asks whether the percent decline in the crude birth rate in Latin America over a ten-year interval is affected by socioeconomic variables such as family planning effort, education, infant

mortality, GNP per capita, percent urban, and change in percent urban. Tolnay and Christenson (1984) evaluated the same relationship in their 1984 study on the effects of social setting and family planning programs on recent fertility declines in developing countries.

All the variables in the present study, except change in percent urban, were the same ones used by Tolnay and Christenson. The biggest difference between this study and Tolnay's is that family planning programs turned out to have much less influence in Latin America than in the Third World as a whole.

A. Operational Definitions and Data

In all the studies and literature there are inconsistencies or discrepancies in certain definitions of important variables, and often it is hard to measure various data because of lack of information or other difficulties with the measurement of variables. Therefore, much of the time the models that are created to deal with "factors affecting birth rate," for example, become useful only in specific cases. This section will describe some of these problems and some of the definitions commonly used.

The first problem to consider is how to measure the fertility rate, since it is the main focus of this and so many other studies. There are different measures of fertility, and each one has it advantages because of the added amount of information it can provide. The crude birth rate is the least detailed of these measures, giving the number of babies born per thousand of the mid-year population. It doesn't indicate the relative number of children per woman or age structure of population or which age group of the women is the most fertile or women "exposed" to childbearing. However,

crude birth rate is the most readily available measure. Total Fertility rate, age-specific birth rate , child-woman ratio, and even general fertility rate are more useful to have, but the difficulty is finding the sources to provide the necessary information. (Jones 1981, 91)

Education is another factor which can be measured in several different ways or using different criteria. UNESCO reports education using the proportion of adults aged 25 and over who have had no schooling. Another measure of education is the age-specific school enrollment ratio. (Merrick 1986: 33)

Shortage of data is a common setback in studies of Latin America. Estimates are used in many cases simply because the censuses and registration systems cannot account for everyone accurately. (Tsui and Bogue1978, 9) Severe undercounts occur, especially for children under five. The Mauldin and Berelson data set of crude birth rate decline in Third World countries that Tolnay and Christenson used for their path analysis model did not list any of the relevant data for Argentina and so this country could not be included in the calculations of statistics using that data set. Another setback occurs when the data that is collected is reported in a slanted manner to reflect positively on the current government. An organiztion called CELADE (United Nations Latin American Demographic Center), based in Chile, compiles data sets that anticipate some of these deficiencies and attempts to correct for them. (Merrick 1986, 6)

Studies dealing with the effects of urbanization must first define what is meant by "urban area," usually in terms of population. The wide range of this definition among studies is enough to raise some questions. The United Nations rates communities with more than 20,000 inhabitants as

urban, and for the Latin American case this seems more appropriate. Other studies, such as the widely-cited Mauldin and Berelson study, use 100,000 people as their minimum for an "urban" area. This leaves smaller countries such as Barbados and Trinidad-Tobago with zero percent of their population defined as "urban."

Next, it is necessary to find variables which will help measure this concept called "urbanism," which is the "western" mindset that is assumed to accompany urbanization. Since this is an abstract concept, surrogate variables are needed in order to measure urbanism. This is the point at which all the socioeconomic variables listed above come into play; they are meant to indicate different aspects of life which could potentially change when a move to a new place (such as from the country to a large town or city) takes place. "Urbanism" could also be reflected in changes in birth rates, influenced indirectly through the socioeconomic variables.

Changes in mindset related to urbanism take some time to be assimilated by newcomers and even longer to actually have effects on their choices and actions. Tsui and Bogue try to adjust for lag time in their model by using data from different years, hoping that they have chosen appropriate intervals. (1978, 30). Tolnay and Christenson acknowledge that there is a lag and that the best thing for long-term interests of the developing world is to invest right away in family planning programs in order to "initiate or accelerate a fertility decline." (1984, 87) Beaver (1975) uses lagged variables as well. Jones (1981) also mentions their importance.

The need for the socioeconomic (secondary) variables to operate through the biological (primary) factors has already been discussed. Another theoretical problem is in measuring the effects of these socioeconomic

variables. Regression analysis accounts for the direct effects, but path analysis, used by Tolnay and Christenson, and also Mauldin and Berelson (1978), tries to take into account the effects of secondary variables such as "status," "education," or "urbanization" on fertility rates.

The inconsistent definition of Latin America in the literature has also already been mentioned. The region is defined as containing 20-22 different countries, each having its own cultural heritage, government, ideology, social and economic conditions, and so on. Every study seems to include a slightly different collection of countries that it defines as belonging to "Latin America." Countries in question include Surinam, Guyana, Barbados, Jamaica, Trinidad-Tobago, and Haiti. The range of definitions goes from all countries south of the United States to the CELADE definition which includes the 18 countries where Spanish is spoken (but not Puerto Rico) and Brazil. (Merrick 1986, 3)

B. Statistical Analysis

The Tolnay study was chosen as a base because it evaluated variables in relation to *changes* in the crude birth rate for sixty-five developing countries. It was this emphasis on rate of change, rather than actual level, as well as the fact that it included most of the standard transition theory determinants of fertility that we used it as a base. Tolnay's study

> . . .estimates the relative effects of social setting and family planning programs on recent declines in fertility in developing countries. . . . Consideration of total effects, direct effects and indirect effects of all variables suggests that family planning program effort has, by far, the largest direct effect on fertility declines. However, social setting, especially school enrollment and infant mortality, has substantial indirect effects. (Tolnay

and Christenson 1984, 72)

The data set used in this study is based on two sources: Tsui and Bogue for family planning index 1972 (which they based on a family planning program effort scale by Lapham and Berelson), and Mauldin and Berelson for infant mortality 1968 [IFMORT], per capita GNP 1960 [GNP], percent urban 1960 [PURBAN], and percent aged 15-19 enrolled in school 1960 [SCHOOL], and the dependent variable, percent decline in crude birth rate 1965-75 [DCBR].

> Proportionate, rather than absolute, fertility change is used since larger absolute changes are likely to occur in high fertility settings. To illustrate, a drop of five births per 1000 population is more significant when it occurs to a base crude rate of 20 than to a base rate of 50. (Tolnay and Christenson 1984, 80)

Characteristics of the Tolnay and Christenson study which didn't seem appropriate included the definition of "urban" as 100,000 or more inhabitants, as opposed to the United Nations definition using 20,000 inhabitants; here the variable on urbanization rate assumes a level of 20,000 people as urban. Gilbert, however, in his study of the spatial allocation of health and education facilities in Third World countries indicated that 100,000 population level was a clear breaking point in distribution of these institutional facilities which do have a great effect on fertility and mortality as well. (1974)

One other problem was that the data set used by Tolnay and Christenson included no data from Argentina on the relevant variables in the data set, requiring this country to be omitted from the present study.

In the results obtained using path analysis, the total variation in

proportionate change in CBR explained by all of their variables was 85%. Tolnay's study found that family planning and school enrollment were the only two variables to have significant effects on recent fertility decline, contributing 71% and 24% respectively to the percent decline in crude birth rate. The other variables made negligible contributions.

Now we come to the core of this study, modifying the Tolnay model by adding rate of urbanization variables and applying it to the Latin American case. In order to parallel Tolnay's emphasis on rate of change, the urbanization variables used here, URBRONE and URBRATE, are proportionate ones, defined as percent change in percent urban. For example,

$$\frac{\text{\% Urban 1960} - \text{\% Urban 1950}}{\text{\% Urban 1950}}$$

gives 1950 to 1960 rate of change. The Statistical Yearbook for Latin America is the source from which I calculated rates of urbanization for two ten-year intervals (1950 to 1960 [URBRONE] and 1960 to 1970 [URBRATE]). The graph on the next page shows the differences in rate and level of urbanization for most of the Latin American countries.

For the emulation of their study in this paper, regression analysis is used on twenty Latin American countries. The countries included in this study are: Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominincan Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela.

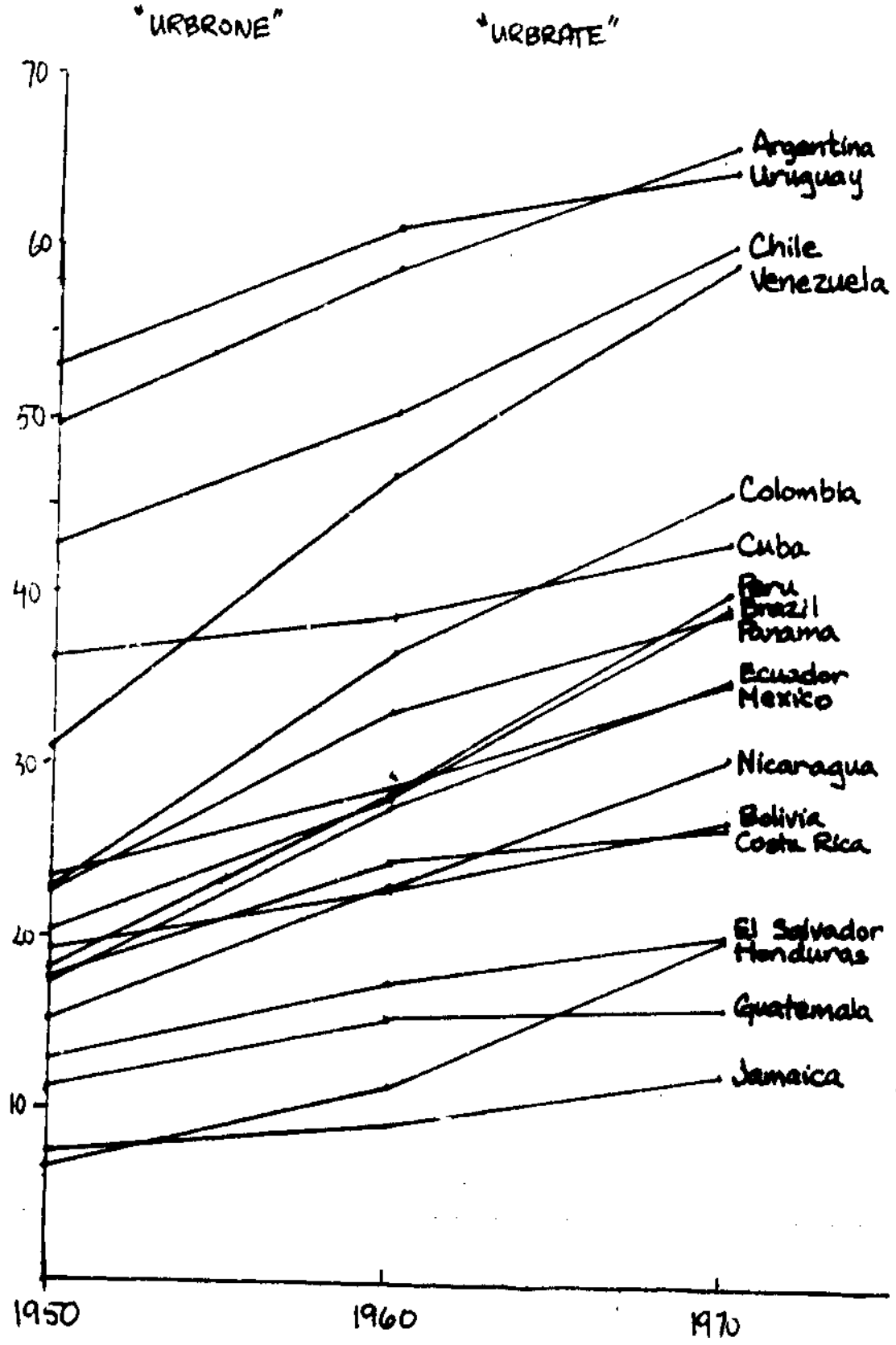
One difference between Tolnay and Christenson's study and this one is that only twenty Latin American countries are used here, instead of the sixty-five Third World countries. Their study was not precisely reproduced for this paper since Tolnay did not specify which sixty-five countries were

chosen out of the available data set, which contained data for ninety-five Third World countries. The focus on Latin America surely brought out some of the cultural differences between Latin America and the rest of the Third World, which is why these results deviated from the Tolnay study. (see table below.) Another difference is that they used path analysis to evaluate variable interrelationships, while regression analysis is used here.

The results are summarized in the table below. It is important to note that the variation explained by the same variables drops immediately to 76% in this Latin American version as contrasted to the original Tolnay study of developing nations, where amount of variation explained by the model was 85%. Family planning plummets from 71% to 19% of the explanation, and school enrollment becomes the most significant contributor, adding 41% to the explanatory power of the model. This could very well be related to basic cultural and historical differences in Latin America as compared to other Third World areas that were included in the Tolnay study. It may be that fertility patterns in Latin America are much different than patterns in the rest of the Third World and so the results are not comparable. (This is the kind of situation that regional geographers like to study.) The decreasing effect of the family planning variable is an indication of the difference in orientation toward schooling in the Latin American fertility experience.

After running the first Latin American version of the Tolnay study, we ran more regression equations, adding the rate of urbanization variable for 1950 to 1960 and 1960 to 1970 and eventually deleting the family planning and school variables which had initially controlled so much of the model explanation.

CHANGES in PERCENT URBAN
1950 - 1970



Percentage of Total Population Living in Localities of over 20,000 people

Source: U.N., Statistical Yearbook, 1984. p. 80.

	FAMPLAN	GNP	SCHOOL	IFMORT	% URBAN	URBRATE	URBRONE	r^2
Tolnay	.711**	.044	.240**	.041	.097			.851**
Run #1	.189**	.055	.406	.106	.005			.761**
Run #2	.182**	.055	.406	.106	.004	.010		.762**
Run #3		.055	.406*	.106*	.004	.010		.580*
Run #4		.050	.406*	.093*	.005	.001	.027	.583*
Run #5		.048	.406*	.093*	.005		.027	.580*
Run #6		.077		.166*	.068	.009	.094	.413
Run #7					.137	.038	.080	.255
Run #8					.137*			.107*
Run #9						.160*		.160*
Run #10							.108	.108

Significance: *.1 level **.01 level

It is evident from the table that even after Family Planning and School are deleted after Run #5, the urbanization rates components show no significant relationship to rate of fertility decline. Immediately, in this case, infant mortality takes up some of the slack. As soon as SCHOOL and FAMPLAN are removed from the model in Run #6, the predictive value of the model drops to 41%. Infant mortality is removed in the next run, leaving only the urbanization variables to explain change in fertility, and the r-square drops down to 25% and lower beginning in Run #7 It becomes evident that even without the involvement of the other socioeconomic variables, urbanization has a minimal effect on the dependent variable. The strongest result from among the urbanization variables was the 16% explanation offered by URBRATE (rate of urbanization between 1950 and 1960) in explaining the 1965 to 1975 CBR decline in Run #9. Obviously neither the rate of urbanization nor the level of urbanization has any effect on fertility decline when we control for the effects of education and family planning.

If time permitted, several changes would be made in the framework of this study, no longer basing itself on the Tolnay study. All these trials would be repeated with a new data set that includes Argentina and includes urbanization data with a threshold of 20,000 people. It would use a more sophisticated measure of fertility, something like total fertility rate adjusted for the age-sex structure of the population. It would also be beneficial to allow for the lag effect in a more precise or systematic manner. Several new variables that would be helpful to consider include: women's participaton rate in non- agricultural labor force, and a measure of primacy (perhaps using percent of the total population in the major city). Many of these variables can be equated with "urbanism," or the mindset assumed to accompany urbanization. Since the number of cases cannot really exceed much more than twenty if only the countries of Latin America are used as units, the choice of variables must be very selective in order to keep degrees of freedom at a maximum.

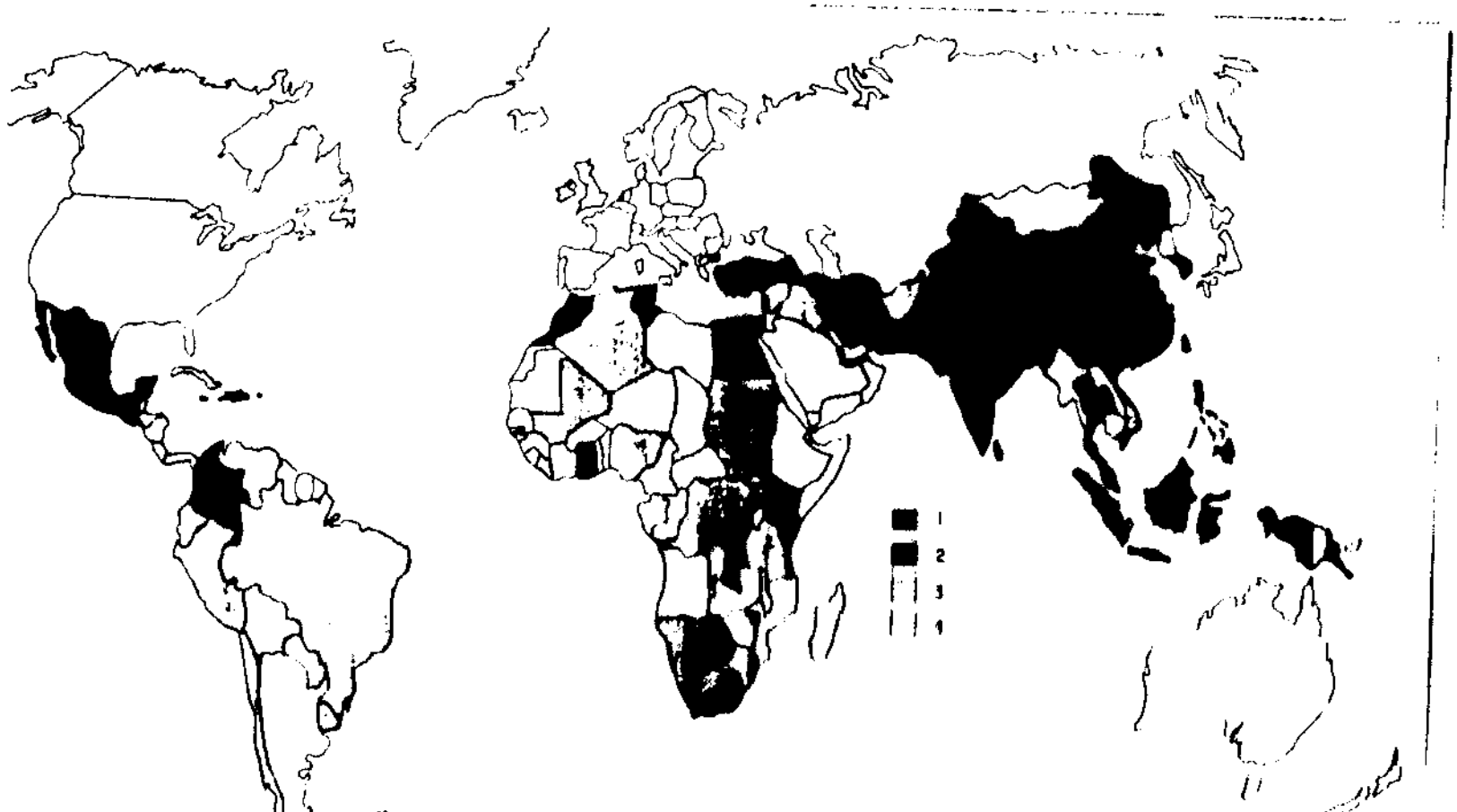
IV. Summary and Conclusions

The view held in this study is that Latin America needs to continue to reduce its birth rates, despite the major reductions that have already occurred. Mortality rates are going to continue to fall as health care improves, and this will widen the gap between births and deaths again, leading to increased net growth. Ultimately, the continued decline in fertility would also ease some of the strain on social systems such as

schools, hospitals, public services, and housing. The result would be increased living standards as long as the benefits of the new social prosperity were equally accessible in both a spatial and a financial sense. As it stands, this is not the case.

It must not be assumed that education automatically increases or that infant mortality goes down just because urbanization occurs. There is more to development than redistribution of people; it must be accompanied by more involvement with planning and exension of social services in urban areas, which is easier said than done. "The costs of meeting social needs in the largest metropolitan centers are. . . beyond the potential capacity of developing nations to pay." (Rondinelli 1983, 31)

In 1976, only a few countries in Latin America (see map on next page) Mexico and Colombia being the major ones, had official policies to reduce population growth rate. The other countries did have official support for family planning activities, which were "supported essentially on grounds of health, human rights, and family welfare, regardless of any national demographic impact," and were not financed by their governments. (Jones 1981, 190) Part of the reason for lack of official government policy is due to the "suspicion that United States imperialism has been imposing birth control as a means of limiting the emerging power of Latin America." (Jones 1981, 190) Ironically, they allow family planning for the "wrong" reasons, but with the "right" intended result: an improved quality of life. Outside planners don't always consider the surroundings in which their programs have to function; as we have seen, however, outright family planning in Latin America only works when paired with social improvement, and even then, family planning effort is not the most critical factor in fertility decline.



Government stances on population growth and on family planning among less developed countries in 1976: 1 – official policy to reduce population growth rate; 2 – official support of family planning activities for other than demographic reasons; 3 – the rest of the less developed world; 4 – developed countries generally with low fertility

Source: N. Norman and E. Hofstatter (1976), *Population and Family Planning Programs: A Factbook*, Population Council, New York

Source: Jones 1981, 171.

Considering the results of this study, policy makers in Latin America who do consider their birth rates to be excessive should not count on the urbanization factor alone for help in lowering fertility rates. Rondinelli's case for the development of secondary cities explains the need for better quality of urbanization, and again the need for more equal distribution of available services. Any country hoping for improvement based solely on unplanned rural urban migration or urban growth will undoubtedly be disappointed.

In considering the direct effects of family planning and the indirect effects of school enrollment on infant mortality, Tolnay and Christenson concluded it is the *joint* influence of social setting and family planning programs that has made the biggest impact on the rate of fertility decline. (1984, 84)

However, the results of the Latin American case point toward the decreased importance of family planning and the increased value of some of the indirect variables in the search for reduced fertility rates; hence, the policy emphasis in this region should reflect this difference. Tolnay explains that "Implementation of certain social changes may have important effects on reproductive motivation and fertility trends. For example, a clear implication of our findings is that national investments made toward reducing infant mortality and expanding educational attainment may have beneficial, unintended, effects of lowering birth rates." (1984, 86)

The original goal of this paper was to try to show that very rapid urbanization had a negative, dampening effect on fertility decline in Latin America. However, this more complex problem remains for future study and the availability of more comprehensive data.

This study indicates that implementation of a national family planning program in Latin America without emphasis on other social development will not be very effective. Jones explains that "AID missions in Latin America were advised to consider population programs a priority area," but nothing is mentioned about education or other social services. (1981, 189) Since education and infant mortality showed up as important elements in determining fertility decline in Latin America, "family planning" effort should be expanded to include more basic educational skills and more broad-based health care, including post-natal medical help. This way, any international aid organizations that care to help will be spending their money more effectively.

Future studies of the effect of urbanization rate on fertility decline must consider some of the qualifications that have been made here. Some important issues have been brought to light, the most important among them being that urbanization has not made a positive impact on fertility decline in Latin America. The results of this study indicate that in the Latin American case, urbanization has no significant effect on fertility when other socioeconomic variables are entered into the regression equation as a kind of control. Education proved to be the most important contributor to fertility decline, and further investigation will certainly yield more detailed results on the question concerning whether or not rapid urbanization in fact has a negative effect on declines in the birth rate. In the meantime, this first step has been taken.

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